



User manual

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APPLICABLE STANDARDS

The AI-02UI module is suited for the CiA DS301 protocol [1] and implements the CiA DS 404 standard Device Profile, as far as the Analogue Input Function Block is concerned [2].

Characteristics

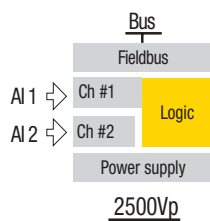
Technical data

| | |
|-------------------------------------|---|
| Accuracy at 25°C | ±0.1% FS (RTD = ±0.05% FS) |
| Temperature coefficient | 0.005% FS/K |
| Cold junction compensation accuracy | ±0.5°C (between 0...50°C) |
| Input impedance | mA < 300Ω mV > 100MΩ V > 10kΩ |
| Digital resolution | 16 bit |
| Input types | TC J, K, L, N, R, S, T - Pt100, Pt1000 - mA, mV, V Potentiometer and other SW downloadable TCs |
| Conversion time | 20 ms (RTD = 120 ms) |
| Overvoltage protection | 30 V |
| NMR 50...60Hz | > 80 dB |
| CMRR | > 100 dB |

General

| | |
|---------------------------------|---|
| 3 way isolation | 2.5 kVp |
| Power supply | 24 Vdc; -15...+25% |
| Power consumption | 2.5 W |
| Dimensions | L: 65; H: 110; W: 66 |
| Weight | 220 g |
| Safety regulations EN61010-1 | Isolation class II (50 Vrms), Installation category II, Pollution degree 2 |
| CE marking | EN61131-2 |

3 way isolation diagram



Environment

| | Operating | Storage |
|---------------------|--|---|
| Temperature | -10...+65°C | -40...+85°C |
| Relative Humidity | 5...95% non condensing Appropriate measures must be taken against humidity >85% | 5...95% non condensing For a short period, slight condensation may appear on the housing |
| Mounting | Vertical, free air | |
| Protection | IP20 | |
| Vibrations (3 axes) | 10...57Hz 0.0375mm 57...150Hz 0.5g | |
| Shock (3 axes) | 15g, 11ms half sine | |

CANopen I/O module 2 Universal Isolated Analogue Inputs mod. **IO-CB/AI-02UI**



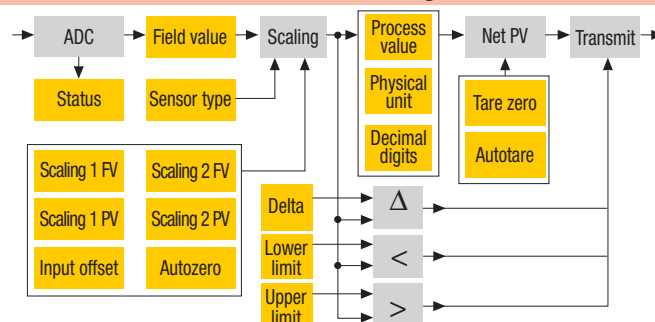
2 isolated inputs for:

- Thermocouples
- RTD
- mA, mV, V linear inputs
- Potentiometers
- Custom sensors



- 1) The product described in this manual should only be installed, operated and maintained by qualified application programmers and software engineers who are familiar with automation safety concepts and applicable national standards.
- 2) This product supports the Parameter defaults indicated by CiA standards, in addition, some parameters have a factory set (value present in the module when comes from the factory). The default values can be loaded with the restore command, but after the restore, factory set values are lost.

Functional Block Diagram



The analogue input function block describes, for each input channel, how field values are converted to process values. The field values are converted to the real physical dimension of the measured quantity, and the result is called "Process Value". The conversion from Field Value to Process Value is generally described as a linear transformation.

This is defined by two pairs of field values and corresponding process values (Input Scaling 1 FV/Input Scaling 1 PV and Input Scaling 2 FV/Input Scaling 2 PV), called calibration point 1 and 2.

Non-linear transformation (e.g. for thermocouples and PT100 sensors) is possible, and is defined within the parameter "Sensor Type". In this case the input scaling values are meaningless.

The calibration characteristic can be shifted by an additional "input offset" value.

Writing "1" on autozero will enable the zero offset value to be set so that the instantaneous measured "process value" becomes zero. The tare-zero value works like the zero offset value, but results in an additional "net process value". Writing "1" on autotare will enable the tare zero value to be set so that the instantaneous measured "net process value" becomes zero. The parameters "Span Start" and "Span End" define the process value validity range. If the process value exceeds these limits it will be marked as "overflowed".

PDOs used by the module

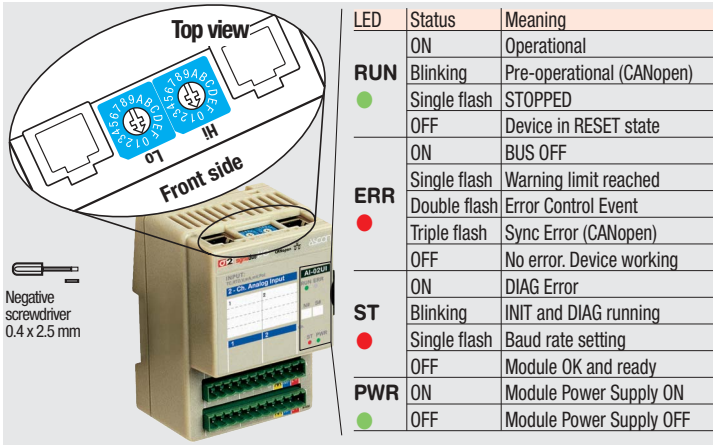
| TPDO | Properties | Mapped objects | Index | Sub-index |
|--------|--------------------------|-----------------------|-------|-----------|
| TPDO 1 | COBID: 180h + NodeID | NetPV1 | 9140h | 01h |
| | Transmission Type: 01h * | AI status 1 | 6150h | 01h |
| TPDO 2 | COBID: 280h + NodeID | NetPV2 | 9140h | 02h |
| | Transmission Type: 01h * | AI status 2 | 6150h | 02h |
| TPDO 3 | COBID: 380h + NodeID | NetPV1 | 9140h | 01h |
| | Transmission Type: 01h * | NetPV2 | 9140h | 02h |
| TPDO 4 | COBID: 480h + NodeID | Cold junction Measure | 2000h | 01h |
| | Transmission Type: 01h * | | | |

Note: * The Transmission Type is configurable:

01h is the factory set (value present in the modules when come from the factory);
FFh is the default value.

Hardware Set-up

Hexadecimal rotary switches, service and I/O LEDs



Bit Rate and Node ID configuration

Bit rate

| Lo switch | Baud rate kbps | Bus length m |
|-----------|----------------|--------------|
| 1 | 20 | 2500 |
| 2 | 50 | 1000 |
| 3 | 100 | 500 |
| 4 | 125 | 500 |
| 5 | 250 | 250 |
| 6 * | 500 | 100 |
| 7 | 800 | 50 |
| 8 | 1000 | 25 |

Node ID

| Hi switch | Lo switch | Valid ID Node |
|-----------|-----------|----------------------|
| 0 | 1 | 01h (address 1) |
| 0 | 2 | 02h (address 2) |
| ↓ | ↓ | ↓ |
| 7 | F | 7Fh (address 127D) * |

Note: * Default value

Procedure for Node ID and Bit Rate configuration

The HI and LO hexadecimal rotary switches set the module's Bit Rate and CAN Node ID. During the configuration, the module must be **off line** and the CAN bus must be physically disconnected.

To configure the module, follow the procedure:

- 1 Turn the Power OFF
- 2 Set the **HI** switch to "F"
- 3 Select the desired Bit Rate value by setting the **LO** switch following the table (e.g. "8" for 1 Mbps)
- 4 Turn the Power ON
- 5 Shift the **HI** switch to "E" (all the module service LEDs should flash)
- 6 Turn the Power OFF. Now configure Node ID
- 7 Set the **HI** and **LO** switches to the desired valid Node ID following the table
- 8 Turn the Power ON.

Alternatively, at step 7 set the value 00h. Then, at the next Power ON, the last valid stored value will be resumed as Node ID.

Default values: Bit Rate = 500 kbps, Node ID = 127D

Parameter configuration

Index 6110h - AI Sensor type

Index 6131h - AI Physical Unit PV

Index 6132h - AI Decimal Digits PV

The AI Physical Unit PV assigns SI units and prefixes to the process value, with the following structure:

| 31 | 24 23 | 16 15 | 8 7 | 0 |
|-----|--------|--------------|----------------|----------|
| MSB | Prefix | SI Numerator | SI Denominator | Reserved |
| | | | | LSB |

Physical units and prefixes are coded according to CiA standard [3]. Within the DS404 profile, some additional physical units are specified:

| Code | Physical unit | Code | Physical unit |
|------|--------------------|------|---------------|
| 55h | m/s | A3h | mmHg |
| 56h | Nm | A4h | atm |
| A1h | at | ABh | PSI |
| A2h | mmH ₂ O | ACH | °F |

| Value | Sensor type | Decimal digits | Value | Sensor type | Decimal digits |
|---------------|-------------|----------------|-----------|-------------|----------------|
| TCJ (default) | 0x01 | 2 | PT1000 | 0x21 | 2 |
| TCK | 0x02 | 2 | PT100 2w | 0x24 | 2 |
| TCL | 0x03 | 2 | PT100 4w | 0x25 | 2 |
| TCN | 0x04 | 2 | 0...10V | 0x2A | 3 |
| TCR | 0x05 | 2 | 0...150mV | 0x2F | 3 |
| TCS | 0x06 | 2 | 4...20mA | 0x33 | 3 |
| TCT | 0x07 | 2 | 0...20mA | 0x34 | 3 |
| PT100 3w | 0x1E | 2 | POT | 0x78 | 3 |

(Sub-Index 1 → channel 1, Sub-Index 2 → channel 2)

Index 61A0h - AI Filter Type

Index 61A1h - AI Filter Constant

AI Filter Type defines the type of filter to be applied to FV, AI Filter Constant defines the iteration index. For both entries, subindex 01 refers to module channel 1 and subindex 02 refers to module channel 2.

| Value | Description | Operation |
|-------|-------------------|---|
| 0 | No filter | |
| 1 | Moving average | $Value_N = Value_{N-1} + \frac{Input - Value_{N-1}}{Filter\ Constant}$ |
| 2 | Repeating average | $Value = \frac{\sum_{N=1}^N Input_N}{N}$ <i>N depends on Filter Constant</i> |

Module specific parameters

Index 2000h - Cold Junction Measure

Temperature of the cold junction, measured on the module's terminal block. Available through TPD04.

Index 2005h - 50/60 Hertz Input Filter

Filter against the Vac power line frequency

Index 3000h - Node Address

Current Module Node ID - Read only access

Index 3001h - Baudrate

Current Module Bit rate - Read only access

Scaling input variables

Index 9120h - AI Input Scaling 1FV

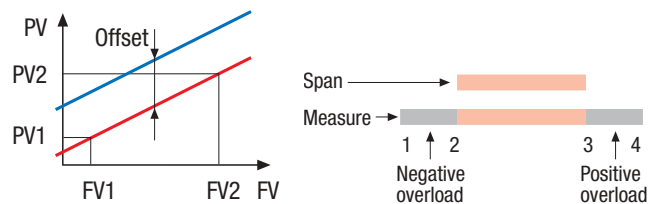
Index 9121h - AI Input Scaling 1PV

Index 9122h - AI Input Scaling 2FV

Index 9123h - AI Input Scaling 2PV

Index 9124h - AI Input Offset

As regards linear inputs, the above variables allow the scale of the physical input to be changed and the desired physical unit to be assigned to this input. In addition, an offset can be added.



Index 9148h - AI Span start

Index 9149h - AI Span end

These two variables take into account the validity of the span values, indicating possible overloads and limiting the measure in correspondence of the extreme points of the span.

Span programmed values (°C)

| Input | Span Start | Span End | Input | LO Range | HI Range | Span Start | Span End |
|-------|------------|----------|-----------|----------|----------|------------|----------|
| TCJ | -210°C | 1200°C | PT100 | - | - | -200°C | 600°C |
| TCK | -200°C | 1372°C | PT1000 | - | - | -200°C | 600°C |
| TCL | -200°C | 600°C | 0...10V | 0 | 10.5 | 0V | 10V |
| TCN | 0°C | 1300°C | 0...150mV | 0 | 155 | 0mV | 150mV |
| TCR | 0°C | 1600°C | 4...20mA | 0 | 21 | 4mA | 20mA |
| TCS | 0°C | 1760°C | 0...20mA | 0 | 21 | 0mA | 20mA |
| TCT | -200°C | 400°C | POT | 0 | 100 | 0% | 100% |

Index 6150h – AI Status

| bit 7 – 3 | 2 | 1 | 0 |
|-----------|-------------------|-------------------|-------------------------------|
| Reserved | Negative overload | Positive overload | Not valid (e.g. sensor break) |

Index 9138h – Tare Zero

Tare value to be subtracted from PV.

Index 6114h – AI ADC Sample Rate

ADC acquisition time.

Index 6F20h – Life Counter

A counter that increments at each new generated sample.

Index 9143h – AI Interrupt Delta NetPV

Index 9144h – AI Interrupt Lower Limit Net PV

Index 9145h – AI Interrupt Upper Limit Net PV

The last the variables relate to the asynchronous mode of transmission of a PDO (transmission type 255). A comparison is made with the mapped Net PV value and a transmission is initiated asynchronously when any of the limits is reached.

Commands

Index 6112h – AI Operating Mode

Determines the operating state of the two input channels according to the following values:

| | |
|-----|---------------------------------------|
| 00h | Initialising (default) |
| 01h | Operating |
| 0Ah | Custom linearisation table assignment |

Index 6160h – AI Control Byte

Enables (1) or disables (0) some of the commands accepted by the module:

| Bit | 7 – 3 | 2 | 1 | 0 |
|------------|----------|-----------|-----------|------------------|
| 1 = active | Reserved | Auto-tare | Auto-zero | Auto-calibration |

Index 6111h – AI Autocalibration

While in initialisation mode, the module can execute an autocalibration procedure upon receipt of an SDO containing the “cali” signature in the data field.

| Byte | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------|--------------------------|-----|-----|------------------|-----|-----|-----|-----|
| Write request | 22h | 11h | 61h | 0xh ¹ | 63h | 61h | 6Ch | 69h |
| | COB – ID = 600h + NodeID | | | | | | | |

Notes: [1] x = 1 for channel 1, x = 2 for channel 2

Index 6125h – AI Autozero

Upon receipt of an SDO containing the “zero” signature in the data field, the module modifies the AI Input Offset in such a way that the AI Input PV becomes zero.

| Byte | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------|--------------------------|-----|-----|------------------|-----|-----|-----|-----|
| Write request | 22h | 25h | 61h | 0xh ¹ | 7Ah | 65h | 72h | 6Fh |
| | COB – ID = 600h + NodeID | | | | | | | |

Notes: [1] x = 1 for channel 1, x = 2 for channel 2

Index 6139h – AI Autotare

Writing a signature value of “tara” to this object causes the AI Tare Zero to be modified in such a way that the actual AI Net PV becomes zero.

| Byte | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------|--------------------------|-----|-----|------------------|-----|-----|-----|-----|
| Write request | 22h | 39h | 61h | 0xh ¹ | 74h | 61h | 72h | 61h |
| | COB – ID = 600h + NodeID | | | | | | | |

Notes:

[1] x = 1 for channel 1, x = 2 for channel 2

Emergency messages

The module automatically sends emergency messages including error codes. The communication errors are described in CiA DS301 [1]. The error codes are expressed as a DEVICE SPECIFIC ERROR type of code, one for each channel: 0xFF01 for channel 1 and 0xFF02 for channel 2. The codes indicating a specific condition are also inserted, following the table below:

| Error code | Error |
|------------|--|
| 000000000 | No error – This code is generated when exiting an error condition, to notify the end of one of the error states |
| 000000001 | Error No Valid Calib – An attempt to change the state of a input channel not properly calibrated to “operating” |
| 000000002 | Error No Config – An attempt to change the state of a input channel with a non valid Sensor Type to “operating” |
| 000000006 | Error No Command – Invalid command received |
| 000000007 | Error Wrong Command – An attempt to execute a command from an illegal state |
| 000000008 | Error Wrong Assignment – An attempt to assign a parameter from an illegal state |

| Emergency Message | 0 0xh ¹ | 1 FFh | 2 21h | 3 00h | 4 00h | 5 00h | 6 0Eh | 7 00h |
|-----------------------------------|-----------------------|----------|----------|----------|----------|----------|----------|----------|
| COB – ID = [entry 1014h] + NodeID | | | | | | | | |

Notes: [1] x = 1 for channel 1, 2 for channel 2

Error

Parameter Store/Restore

This module allows parameters to be saved in a non volatile memory. In order to avoid storing parameters by mistake, storage is only executed when a specific signature is written to the appropriate subindex. The signature is “save”.

Similarly, the default values of parameters, according to the communication or device profile, are restored. On receipt of the correct signature in the appropriate subindex, the device restores the default parameters and then confirms the SDO transmission. The signature is “load”.

The new configuration becomes active after a reset, i.e. after a “Power OFF/Power ON cycle” or an NMT “Reset Node” message.

| Byte | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------|--------------------------|-----|-----|-----|-----|-----|-----|-----|
| Store Parameter | 22h | 10h | 10h | 01h | 73h | 61h | 76h | 65h |
| | COB – ID = 600h + NodeID | | | | | | | |
| Restore Parameter | 22h | 11h | 10h | 01h | 6Ch | 6Fh | 61h | 64h |
| | COB – ID = 600h + NodeID | | | | | | | |

SDO Messages

The entries of a device Object Dictionary are accessed through SDO (Service Data Object) messages. The basic SDO messages are as follows, as based on the Client – Server request and response model:

| Byte | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------|--------------------------|-------|---|-----------|----------|---|---|---|
| Read request | 40h | Index | | Sub-Index | Reserved | | | |
| | COB – ID = 600h + NodeID | | | | | | | |
| Read response | 4xh * | Index | | Sub-Index | Data | | | |
| | COB – ID = 580h + NodeID | | | | | | | |
| Write request | 22h | Index | | Sub-Index | Data | | | |
| | COB – ID = 600h + NodeID | | | | | | | |
| Write response | 60h | Index | | Sub-Index | Reserved | | | |
| | COB – ID = 580h + NodeID | | | | | | | |

* This code is type dependant.

Please refer to the CiA DS301 Profile for more details.

Reference documents

List of CiA documents to which the user should refer:

- [1] CiA DS301 - CANopen Application Layer and Communication Profile
- [2] CiA DS404 - CANopen Device Profile: Measuring Devices and Closed-Loop Controllers
- [3] CiA DRP303-2 – Representation of SI Units and Prefixes

Accessories, Spare Parts and Warranty

| | |
|--------------------------------|--------------------|
| Power Supply 45W 24Vdc 2A | AP-S2/AL-DR45-24 |
| Power Supply 120W 24Vdc 5A | AP-S2/AL-DR120-24 |
| Additional Terminal Block 2x11 | AP-S2/TB-211-1 |
| Female Plug 11 Screw clamp | AP-S2/SPINA-V11 |
| Female Plug 11 Spring clamp | AP-S2/SPINA-M11 |
| RJ45 terminated cable 14cm | AP-S2/LOCAL-BUS76 |
| RJ45 terminated cable 22cm | AP-S2/LOCAL-BUS152 |
| CAN termination Adapter | AP-S2/TERM-CAN |

Warranty: 3 years excluding defects due to improper use

Object Dictionary structure (with default values)



In order to configure the module, it is necessary to connect it to a PC with the CAN interface and the supervisory software installed. The configuration can be obtained by writing the desired values to the module's variables listed in the Object Dictionary.

| Index (hex) | Sub Index | Object | Name | Default [hex] | Type | Acc. Attr. | MO |
|-------------|-----------|--------|---|---------------|------------------|------------|----|
| 1000 | | VAR | Device Type | 00020194 | UNSIGNED32 | RO | M |
| 1001 | | VAR | Error Register | 00 | UNSIGNED8 | RO | M |
| 1003 | | ARRAY | Predefined error field | 00000000 | UNSIGNED32 | RO | 0 |
| 1005 | | VAR | COB-ID SYNC | 00000080 | UNSIGNED32 | RW | 0 |
| 1006 | | VAR | Communication cycle period | 00000000 | UNSIGNED32 | RW | 0 |
| 1007 | | VAR | Synchronous window length | 00000000 | UNSIGNED32 | RW | 0 |
| 1008 | | VAR | Manufacturer Device Name | "02UI" | Vis-String | const | 0 |
| 1009 | | VAR | Manufacturer Hardware Version | "1.00" | Vis-String | const | 0 |
| 100A | | VAR | Manufacturer Software Version | "1.00" | Vis-String | const | 0 |
| 100C | | VAR | Guard Time | 0000 | UNSIGNED16 | RW | 0 |
| 100D | | VAR | Life Time Factor | 00 | UNSIGNED8 | RW | 0 |
| 1010 | | ARRAY | Store Parameters | | UNSIGNED32 | | 0 |
| | 00h | VAR | Largest subindex supported | 01 | UNSIGNED8 | RO | |
| | 01h | VAR | Save all parameters | 03 | UNSIGNED32 | RW | |
| 1011 | | ARRAY | Restore Default Parameters | | UNSIGNED32 | RW | 0 |
| | 00h | VAR | Largest subindex supported | 01 | UNSIGNED8 | RO | |
| | 01h | VAR | Restore all default parameters | 01 | UNSIGNED32 | RW | |
| 1014 | | VAR | COB-ID EMCY | 80+NodeID | UNSIGNED32 | RW | 0 |
| 1015 | | VAR | Inhibit Time EMCY | 0000 | UNSIGNED16 | RW | 0 |
| 1017 | | VAR | Producer heartbeat time | 07D0 | UNSIGNED16 | RW | 0 |
| 1018 | | RECORD | Identity Object | | Identity (23h) | | M |
| | 00h | VAR | Number of entries | 01 | UNSIGNED8 | RO | |
| | 01h | VAR | Vendor ID | 000000E9 | UNSIGNED32 | RO | |
| 1200 | | RECORD | Server SDO Parameters | | | | |
| 1800 | | RECORD | 1 st Transmit PDOComm Param. | | PDOCommPar (20h) | | M |
| | 00h | VAR | Largest subindex supported | 05 | UNSIGNED8 | RO | |
| | 01h | VAR | COB-ID used | 180+NodeID | UNSIGNED32 | RW | |
| | 02h | VAR | Transmission type | FF * | UNSIGNED8 | RW | |
| | 03h | VAR | Inhibit time | 0000 | UNSIGNED16 | RW | |
| | 04h | VAR | Reserved | | UNSIGNED8 | RW | |
| | 05h | VAR | Event timer | 0000 | UNSIGNED16 | RW | |
| 1801 | | RECORD | 2 nd Transmit PDOComm Param. | | PDOCommPar (20h) | | M |
| | 00h | VAR | Largest subindex supported | 05 | UNSIGNED8 | RO | |
| | 01h | VAR | COB-ID used | 280+NodeID | UNSIGNED32 | RW | |
| | 02h | VAR | Transmission type | FF * | UNSIGNED8 | RW | |
| | 03h | VAR | Inhibit time | 0000 | UNSIGNED16 | RW | |
| | 04h | VAR | Reserved | | UNSIGNED8 | RW | |
| | 05h | VAR | Event timer | 0000 | UNSIGNED16 | RW | |
| 1802 | | RECORD | 3 rd Transmit PDOComm Param. | | PDOCommPar (20h) | | M |
| | 00h | VAR | Largest subindex supported | 05 | UNSIGNED8 | RO | |
| | 01h | VAR | COB-ID used | 380+NodeID | UNSIGNED32 | RW | |
| | 02h | VAR | Transmission type | FF * | UNSIGNED8 | RW | |
| | 03h | VAR | Inhibit time | 0000 | UNSIGNED16 | RW | |
| | 04h | VAR | Reserved | | UNSIGNED8 | RW | |
| | 05h | VAR | Event timer | 0000 | UNSIGNED16 | RW | |
| 1803 | | RECORD | 4 th Transmit PDOComm Param. | | PDOCommPar (20h) | | M |
| | 00h | VAR | Largest subindex supported | 05 | UNSIGNED8 | RO | |
| | 01h | VAR | COB-ID used | 480+NodeID | UNSIGNED32 | RW | |
| | 02h | VAR | Transmission type | FF * | UNSIGNED8 | RW | |
| | 03h | VAR | Inhibit time | 0000 | UNSIGNED16 | RW | |
| | 04h | VAR | Reserved | | UNSIGNED8 | RW | |
| | 05h | VAR | Event timer | 0000 | UNSIGNED16 | RW | |
| 1A00 | | RECORD | 1 st Transmit PDOMapping | | PDOMapping (21h) | | M |
| | 00h | VAR | No. of mapped application obj | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | Net PV1 | 91400120 | UNSIGNED32 | RO | |
| | 02h | VAR | AI status Ch 1 | 61500108 | UNSIGNED32 | RO | |
| 1A01 | | RECORD | 2 nd Transmit PDOMapping | | PDOMapping (21h) | | M |
| | 00h | VAR | No. of mapped application obj | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | Net PV2 | 91400220 | UNSIGNED32 | RO | |
| | 02h | VAR | AI status Ch 2 | 61500208 | UNSIGNED32 | RO | |
| 1A02 | | RECORD | 3 rd Transmit PDOMapping | | PDOMapping (21h) | | M |
| | 00h | VAR | No. of mapped application obj | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | Net PV1 | 91400120 | UNSIGNED32 | RO | |
| 1A03 | | RECORD | 4 th Transmit PDOMapping | | PDOMapping (21h) | | M |
| | 00h | VAR | No. of mapped application obj | 01 | UNSIGNED8 | RO | |
| | 01h | VAR | Cold Junction Measure | 20000110 | UNSIGNED32 | RO | |
| | 02h | VAR | | 00000000 | UNSIGNED32 | RO | |
| 2000 | | ARRAY | Cold Junction Temperature | | INTEGER16 | | 0 |
| | 00h | VAR | Number of entries | 01 | UNSIGNED8 | RO | |
| | 01h | VAR | Cold Junction Measure | | INTEGER16 | RO | |
| 2005 | | VAR | 50/60 Hz Input Filter | 00 | UNSIGNED8 | RW | 0 |
| 3000 | | VAR | Node Address | 7F | UNSIGNED8 | RO | 0 |
| 3001 | | VAR | Node Baudrate | 06 | UNSIGNED8 | RO | 0 |
| 3500 | | ARRAY | Out of Range mode | | UNSIGNED8 | | C |
| | 00h | VAR | Number of entries | 2 | UNSIGNED8 | RO | |
| | 01h | VAR | Ch1 Out of Range mode | 0 | UNSIGNED8 | RW | |
| | 02h | VAR | Ch2 Out of Range mode | 0 | UNSIGNED8 | RW | |
| 6110 | | ARRAY | AI Sensor Type | | UNSIGNED16 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Sensor Type ch1 | 01 | UNSIGNED16 | RW | |
| | 02h | VAR | AI Sensor Type ch2 | 01 | UNSIGNED16 | RW | |
| 6111 | | ARRAY | AI Autocalibration | | UNSIGNED32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | | |
| | 01h | VAR | AI Autocalibration ch1 | | UNSIGNED32 | WO | |
| | 02h | VAR | AI Autocalibration ch1 | | UNSIGNED32 | WO | |
| 6112 | | ARRAY | AI Operating Mode | | UNSIGNED8 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Operating Mode ch1 | 00 | UNSIGNED8 | RW | |
| | 02h | VAR | AI Operating Mode ch2 | 00 | UNSIGNED8 | RW | |
| 6114 | | ARRAY | AI ADC Sample Rate | | UNSIGNED32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI ADC Sample Rate ch1 | 00004E20 | UNSIGNED32 | RO | |
| | 02h | VAR | AI ADC Sample Rate ch2 | 00004E20 | UNSIGNED32 | RO | |
| 6125 | | ARRAY | AI Autozero | | UNSIGNED32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Autozero ch1 | | UNSIGNED32 | WO | |
| | 02h | VAR | AI Autozero ch2 | | UNSIGNED32 | WO | |

| Index (hex) | Sub Index | Object | Name | Default [hex] | Type | Acc. Attr. | MO |
|-------------|-----------|--------|-------------------------------------|---------------|------------|------------|----|
| 6131 | | ARRAY | AI Physical Unit PV | | UNSIGNED32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Physical Unit PV ch1 | 002D0000 | UNSIGNED32 | RW | |
| | 02h | VAR | AI Physical Unit PV ch2 | 002D0000 | UNSIGNED32 | RW | |
| 6132 | | ARRAY | AI Decimal Digits PV | | UNSIGNED8 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Decimal Digits PV ch1 | 02 | UNSIGNED8 | RW | |
| | 02h | VAR | AI Decimal Digits PV ch2 | 02 | UNSIGNED8 | RW | |
| 6139 | | ARRAY | AI AutoTare | | UNSIGNED32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI AutoTare ch1 | | UNSIGNED32 | WO | |
| | 02h | VAR | AI AutoTare ch2 | | UNSIGNED32 | WO | |
| 6150 | | ARRAY | AI Status | | UNSIGNED8 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Status ch1 | 00 | UNSIGNED8 | RO | |
| | 02h | VAR | AI Status ch2 | 00 | UNSIGNED8 | RO | |
| 6160 | | ARRAY | AI Control Byte | | UNSIGNED8 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Control Byte ch1 | | UNSIGNED8 | WO | |
| | 02h | VAR | AI Control Byte ch2 | | UNSIGNED8 | WO | |
| 61A0 | | ARRAY | AI Filter Type | | UNSIGNED8 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Filter Type ch1 | 00 | UNSIGNED8 | RW | |
| | 02h | VAR | AI Filter Type ch2 | 00 | UNSIGNED8 | RW | |
| 61A1 | | ARRAY | AI Filter Constant | | UNSIGNED8 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Filter Constant ch1 | 01 | UNSIGNED8 | RW | |
| | 02h | VAR | AI Filter Constant ch2 | 01 | UNSIGNED8 | RW | |
| 6F20 | | ARRAY | Life Counter | | UNSIGNED8 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | Life Counter ch1 | 00 | UNSIGNED8 | RO | |
| | 02h | VAR | Life Counter ch2 | 00 | UNSIGNED8 | RO | |
| 9100 | | ARRAY | AI Input FV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Input FV ch1 | | INTEGER32 | RO | |
| | 02h | VAR | AI Input FV ch2 | | INTEGER32 | RO | |
| 9120 | | ARRAY | AI Input Scaling 1 FV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Input Scaling 1 FV ch1 | | INTEGER32 | RW | |
| | 02h | VAR | AI Input Scaling 1 FV ch2 | | INTEGER32 | RW | |
| 9121 | | ARRAY | AI Input Scaling 1 PV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Input Scaling 1 PV ch1 | | INTEGER32 | RW | |
| | 02h | VAR | AI Input Scaling 1 PV ch2 | | INTEGER32 | RW | |
| 9122 | | ARRAY | AI Input Scaling 2 FV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Input Scaling 2 FV ch2 | | INTEGER32 | RW | |
| | 02h | VAR | AI Input Scaling 2 FV ch2 | | INTEGER32 | RW | |
| 9123 | | ARRAY | AI Input Scaling 2 PV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Input Scaling 2 PV ch1 | | INTEGER32 | RW | |
| | 02h | VAR | AI Input Scaling 2 PV ch2 | | INTEGER32 | RW | |
| 9124 | | ARRAY | AI Input Offset | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Input Offset ch1 | 00000000 | INTEGER32 | RW | |
| | 02h | VAR | AI Input Offset ch2 | 00000000 | INTEGER32 | RW | |
| 9130 | | ARRAY | AI input PV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI input PV ch1 | | INTEGER32 | RO | |
| | 02h | VAR | AI input PV ch2 | | INTEGER32 | RO | |
| 9138 | | ARRAY | AI Tare Zero | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Tare Zero ch1 | 00000000 | INTEGER32 | RW | |
| | 02h | VAR | AI Tare Zero ch2 | 00000000 | INTEGER32 | RW | |
| 9140 | | ARRAY | AI Net PV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Net PV ch1 | | INTEGER32 | RO | |
| | 02h | VAR | AI Net PV ch2 | | INTEGER32 | RO | |
| 9143 | | ARRAY | AI Interrupt Delta Net PV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Interrupt Delta Net PV ch1 | 00000001 | INTEGER32 | RW | |
| | 02h | VAR | AI Interrupt Delta Net PV ch2 | 00000001 | INTEGER32 | RW | |
| 9144 | | ARRAY | AI Interrupt Lower Limit Net PV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Interrupt Lower Limit Net PV ch1 | FFFFB1E0 | INTEGER32 | RW | |
| | 02h | VAR | AI Interrupt Lower Limit Net PV ch2 | FFFFB1E0 | INTEGER32 | RW | |
| 9145 | | ARRAY | AI Interrupt Upper Limit Net PV | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Interrupt Upper Limit Net PV ch1 | 0001D4C0 | INTEGER32 | RW | |
| | 02h | VAR | AI Interrupt Upper Limit Net PV ch2 | 0001D4C0 | INTEGER32 | RW | |
| 9148 | | ARRAY | AI Span Start | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Span Start ch1 | FFFFB10 | INTEGER32 | RW | |
| | 02h | VAR | AI Span Start ch2 | FFFFB10 | INTEGER32 | RW | |
| 9149 | | ARRAY | AI Span End | | INTEGER32 | | 0 |
| | 00h | VAR | Number of entries | 02 | UNSIGNED8 | RO | |
| | 01h | VAR | AI Span End ch1 | 0001D4C0 | INTEGER32 | RW | |
| | 02h | VAR | AI Span End ch2 | 0001D4C0 | INTEGER32 | RW | |

* The factory set (value present in the modules when new) for the transmission type is: **01h**.